

XXX.—*Description of a Case of Monstrosity occurring in a Specimen of Dyticus marginalis, in which a portion of the external marks of Sexual Distinction are abortive.*
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It has been remarked that the careful examination of animals in a monstrous state of development, whether of excess or default, is more serviceable in teaching the true nature of animal organization than the investigation of individuals in the normal state. The case of monstrosity now under consideration appears to confirm, in some degree amongst the invertebrata, a theory hitherto founded upon circumstances observed only in the vertebrata. The insect in question is an individual belonging to the species *Dyticus marginalis*, and, judging from the majority of its external characters, is evidently a male insect. It was captured by the Rev. F. W. Hope, in whose collection it is preserved, and to whom I am indebted for an opportunity of examining it.

The external marks of distinction of the male *Dytici* consist in the dilated structure of the four anterior tarsi, the anterior pair of which are moreover furnished with two large and many minute cup-like organs on the under side or sole of the foot, which latter occur also on the sole of the basal joints of the middle feet; and in the smooth and polished surface of the thorax and elytra, the latter of which exhibit also three longitudinal rows of very minute impressed dots. The females have the four anterior tarsi simple and unfurnished, with larger or smaller cups, the sides of the soles being provided with short strong spines; the surface of the thorax is covered with small impressions, and each of the elytra is deeply impressed with ten deep longitudinal furrows, the surface of the elytra being also generally covered with minute punctures, and moreover exhibiting the three rows of larger dots also noticed in the male elytra.

In addition to the sexual distinctive characters mentioned above, there are various others exhibited by the feet of a less important character, which it will be serviceable to notice, especially as I find no completely correct description of them by preceding authors. Mr. Curtis being silent respecting them in his work illustrating the characters of the British genera, and Dr. Erichson (whose otherwise excellent Dissertation, entitled "Genera Dyticeorum,"

has been of great service in the classification of this family of water-beetles, and contains numerous observations on the structural distinctions between the sexes of the types of most of the genera of which it is composed) having overlooked several of these distinctive marks. The anterior tibiæ of the males are much dilated and curved at the base, the inferior external margin from the middle to the tip being flattened, the edges being ciliated and the under edge near the tip and opposite to the large sucker being furnished with a single spur, as represented in my *Modern Classification of Insects* (vol. i. p. 95, fig. 5, 6). In this respect the genus *Dyticus* agrees with *Cybister*, and differs from *Hydaticus*, *Eunectus*, and *Acilius*. The anterior tarsi in this sex are terminated by two spurs equal in size, and each with a small tooth at the base within. In the female the fore tibiæ are straight, not dilated at the base, and furnished with two spurs at the tip. The ungues at the extremity of the tarsi are scarcely smaller than, and formed as in, the males. The middle feet have the ciliation, calcariae and ungues equal and alike in both the sexes, the tibiæ having the upper edge strongly, and the inner scarcely, ciliated, the calcariae of unequal size, and the ungues equal, with a small tooth near the base of each. The hind feet are alike in both sexes, except that in the males both the upper and lower edges of the tibiæ and tarsi are ciliated with fine yellow hairs, whereas in the female the upper edge alone is ciliated.

In Mr. Hope's insect the three basal joints of the anterior tarsus on the right side are dilated, but these are not more than three-fifths of their ordinary width, the joints are of nearly equal size and form, being together a kind of five-sided figure. On the underside the basal joint is destitute of cups, except one of moderate size and imperfect structure at the internal angle, the second joint has about four very small ones placed near the sides, but the third joint is more copiously furnished with little cups, but not to the extent nor of the size of the normal individuals; moreover the extremity of each of the three joints is furnished on the underside with a pair of short strong spines; the intermediate tarsus on the right side is of the ordinary masculine structure, except that the three basal joints are narrower than those on the opposite side. On the left side of the insect the anterior tarsus is nearly of the normal form and structure; the three basal joints are however not so broad nor so uniformly oval as in normal specimens, and on the underside the small cups are not so numerous nor so regularly placed, especially on the internal part of the basal joint. The large basal cup, and the moderate sized lateral cup, are of the ordinary

form and structure. The left intermediate tarsus, on the other hand, has the basal joints rather broader than the right opposite foot, but the small cups on the underside are not so numerous as in the right middle foot. The tibiæ in both of the fore feet are dilated at the base, but each is furnished with *two* spurs at the tip, *as in the female*; the unguis in both fore feet are of equal size, and notched at the base within. The upper edge of the middle tibiæ is furnished with long ciliæ, the under edge is also very slightly ciliated; the calcaria are of unequal size in the middle feet, and the unguis are of equal size and toothed at the base. The hind feet are of the normal form, with the upper and under edges of the tibiæ and tarsi ciliated.

Thus, in respect to the sexual distinctions exhibited by the legs, we find the masculine structure to exist, although not in its full state of development; this imperfection being more especially noticeable on the right side, in which indeed the fore tarsus manifests an approach to the female structure in the short spines on the underside of the basal joints at the tips, and the removal of the little cups from the centre to the sides, so that if the sides of the three basal joints of the fore tarsus on the right side were removed we should have a tolerable representation of the female anterior tarsus. I need scarcely say that this would not occur by treating the ordinary male tarsus in the same manner.

On examining the fore tibiæ, as well as upper surface of the thorax and elytra, we however find more evident proofs of the assumption of the female characters. The thorax is indeed glossy, but an examination of it under a lens shows that its anterior margin is on each side finely punctured, whilst the left lateral margin is also punctured; punctures of the same size are also irregularly scattered in little groups over other parts of the thorax.

The right elytron is impressed close to the suture with four longitudinal furrows extending to the ordinary length of the furrows of the female elytra; the first nearest the suture is broken near its posterior extremity by several raised parts; the second has one break near the tip; the third is the shortest, and is interrupted in the middle; and the fourth is very irregular: the interstices between these furrows are punctured as in the female. The remainder of the right elytron is masculine.

The left elytron has two short furrows near the suture; that next the suture is very short and is several times interrupted, and the second, which is longer, has two long interrupted spaces; near the lateral margin there also exists a deeper furrow much interrupted.

The under side of the abdomen and its extremity are similar to those of the ordinary males.

The theory which this individual appears to authorise us in entertaining is this, that an imperfection of the sexual characters of an individual are occasionally compensated, pro tanto, by the assumption of the characters of the opposite sex. And the circumstance of the assumption of the male plumage by the females of some kinds of birds at an advanced age, and the growth of the beard on the chin and upper lip of aged females, afford some support to this theory. It is true, however, that in these cases the *female* character which has been lost is supplied by *male* characters, whereas the contrary takes place in Mr. Hope's *Dyticus*. It is also true that the neuter hive bee does not support the theory, the neutrality of those individuals being produced by the loss of certain of the characters of the true females, (the inhabitants of the hive having the power to convert a neuter grub into a perfect female or queen bee,) the individuals not assuming any of those of the males. This is, however, an instance of the normal operation of the laws of nature, whereas, perhaps, it would be proper to apply the theory only to true monsters; but if we are to suppose that the theories to be deduced from the study of monstrous productions affords a clue to the real nature of normal productions, such a result ought not to occur, and it is, therefore, with the greater hesitation that I have ventured to suggest it, although the insect in question most clearly warrants it, so far as it is concerned.

DESCRIPTION OF PLATE XI.

Fig. 2. The insect above described of the natural size.

2 *a*, upper, and 2 *b*, under, side of the anterior tibia and tarsus on the left side.

2 *c*, upper, and 2 *b*, under, side of the anterior tibia and tarsus on the right side.

2 *e*, upper, and 2 *f*, under, side of the tarsus of the left middle foot.

2 *g*, upper, and 2 *h*, under, side of the tarsus of the right middle foot.

2 *i*, under side of the anterior tibia and tarsus of the normal male.

2 *k*, under side of the anterior tibia and tarsus of the normal female.